

ASSIGNMENT

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Batch-04
Date:- 19-01-2025

1. Implementing CRUD Operations

You implement Create, Read, Update, and Delete operations by calling specific methods on your Sequelize model objects within your controller logic.

- **Create:** Use the `.create()` method to insert a new row into the database.
- **Read:** Use `.findAll()` to retrieve all records or `.findByPk(id)` to find a specific entry by its primary key.
- **Update:** Use the `.update()` method, which requires a `where` clause to specify which record to modify.
- **Delete:** Use the `.destroy()` method with a `where` clause to remove records from the database.

2. Data Validation and Constraints

Sequelize handles data integrity at both the application level and the database level:

- **Model Validation:** These are defined in the model schema (e.g., `isEmail: true, len: [2, 20]`) and are checked before the query is sent to the database.
- **Constraints:** These are database-level rules such as `allowNull: false, unique: true`, or foreign key restrictions that prevent invalid data from being stored.

3. Defining Relationships

Relationships are defined in your model configuration files to link different tables together.

- **One-to-Many:** For a platform where one course has many enrollments, you use `Course.hasMany(Enrollment)` and `Enrollment.belongsTo(Course)`.
- **Many-to-Many:** If a student can join many courses and a course has many students, you use `User.belongsToMany(Course, { through: 'Enrollments' })`.

4. Role of Sequelize Methods

These built-in methods act as an abstraction layer, translating JavaScript code into SQL queries:

Method	Role	SQL Equivalent
<code>create</code>	Inserts a new record.	<code>INSERT INTO</code>

Method	Role	SQL Equivalent
<code>findAll</code>	Retrieves all records.	<code>SELECT *</code>
<code>findById</code>	Retrieves one record by ID.	<code>SELECT ... WHERE id = x</code>
<code>update</code>	Modifies existing records.	<code>UPDATE ... SET</code>
<code>destroy</code>	Removes records.	<code>DELETE FROM</code>

5. Handling Database Errors Gracefully

To prevent your server from crashing during database issues, you should use a structured error-handling approach:

- **Async/Await:** Use `try/catch` blocks or an `asyncHandler` middleware (as seen in your `app.js`) to catch rejected promises.
- **Middleware:** Pass errors to a global `errorHandler` (like the one imported in your `app.js`) to send a clean JSON response back to the client.
- **Specific Errors:** Check for specific Sequelize error types, such as `SequelizeValidationError` or `SequelizeUniqueConstraintError`, to provide helpful feedback to the user.

Images

```

{
  "name": "20260119",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "type": "commonjs",
  "dependencies": {
    "express": "^5.2.1",
    "react": "^19.2.3"
  },
  "devDependencies": {
    "nodemon": "^3.1.11"
  }
}

PS D:\FULLSTACK 2026\20260119>
  
```

```
C:\Users\91939\OneDrive\Desktop\Fullstack2026>npm init express
Need to install the following packages:
create-express@1.0.4
Ok to proceed? (y) y

npm warn deprecated source-map-url@0.4.1: See https://github.com/lydell/source-map-url#deprecated
npm warn deprecated urix@0.1.0: Please see https://github.com/lydell/urix#deprecated
npm warn deprecated resolve-url@0.2.1: https://github.com/lydell/resolve-url#deprecated
npm warn deprecated source-map-resolve@0.5.3: See https://github.com/lydell/source-map-resolve#deprecated
npm warn deprecated inflight@1.0.6: This module is not supported, and leaks memory. Do not use it. Check out lru-cache if you want a good and tested way to coalesce async requests by a key value, which is much more comprehensive and powerful.
npm warn deprecated formidable@1.2.6: Please upgrade to latest, formidable@v2 or formidable@v3! Check these notes: https://bit.ly/2ZEqIau
npm warn deprecated babel-preset-es2015@6.24.1: 🎉 Thanks for using Babel: we recommend using babel-preset-env now: please read https://babeljs.io/env to update!
npm warn deprecated glob@7.2.3: Glob versions prior to v9 are no longer supported
npm warn deprecated superagent@2.3.0: Please upgrade to superagent v10.2.2+, see release notes at https://github.com/forwardemail/superagent/releases/tag/v10.2.2 - maintenance is supported by Forward Email @ https://forwardemail.net
npm warn deprecated core-js@2.6.12: core-js@<3.23.3 is no longer maintained and not recommended for usage due to the number of issues. Because of the V8 engine whims, feature detection in old core-js versions could cause a slowdown up to 100x even if nothing is polyfilled. Some versions have web compatibility issues. Please, upgrade your dependencies to the actual version of core-js.

> fullstack2026@1.0.0 npx
> create-express
```

```
C:\Users\91939\OneDrive\Desktop\Fullstack2026>
Ln 1 Col 1 Spaces: 2 HTD
> fullstack2026@1.0.0 npx
> create-express
```

```
C:\Users\91939\OneDrive\Desktop\Fullstack2026>npm install express
added 65 packages, and audited 66 packages in 4s

22 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
```

```
C:\Users\91939\OneDrive\Desktop\Fullstack2026>
run npm fund for details
found 0 vulnerabilities
C:\Users\91939\OneDrive\Desktop\Fullstack2026>npm i -D nodemon
added 27 packages, and audited 93 packages in 2s

26 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
C:\Users\91939\OneDrive\Desktop\Fullstack2026>
```

```
.PS D:\FULLSTACK 2026\20260119> {
>>   "name": "John",
>>   "email": "john@gmail.com"
>> }
```

The image shows two instances of Microsoft Visual Studio Code running on a Windows desktop. Both instances have their title bars and panes visible.

Top Window (Left):

- Terminal:** Displays PowerShell history with commands like `Set-ExecutionPolicy RemoteSigned -Scope CurrentUser` and `npm init -y`.
- Code Editor:** Shows a `package.json` file with the following content:

```
{
  "name": "20260119",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "type": "commonjs",
  "dependencies": {
    "express": "^5.2.1",
    "react": "^19.2.3"
  },
  "devDependencies": {
    "node-sass": "^3.1.11"
  }
}
```

Bottom Window (Right):

- Terminal:** Displays PowerShell history with the same commands.
- Code Editor:** Shows a `package-lock.json` file with a large amount of JSON data, listing dependencies and their versions, including `node-sass`, `anymatch`, `balanced-match`, and `binary-extensions`.

The screenshot shows the Visual Studio Code interface with a dark theme. The Explorer sidebar on the left lists files and folders, including a .env file and a package-lock.json file. The main editor area displays the package.json file content:

```
1 {
2   "name": "20260119",
3   "version": "1.0.0",
4   "description": "",
5   "main": "index.js",
6   "Debug": {
7     "scripts": {
8       "test": "echo \\\"Error: no test specified\\\" && exit 1"
9     },
10    "keywords": [],
11    "author": "",
12    "license": "ISC",
13    "type": "commonjs",
14    "dependencies": {
15      "express": "^5.2.1",
16      "react": "^19.2.3"
17    },
18    "devDependencies": {
19      "nodemon": "^3.1.11"
20    }
21 }
```

The right side of the interface includes a Chat window with an AI agent, a status bar at the bottom, and a taskbar at the very bottom.

This screenshot shows the Visual Studio Code interface with a dark theme. The Explorer sidebar on the left lists files and folders, including a .env file and a package.json file. The main editor area displays the package.json file content, identical to the one in the first screenshot. The terminal tab at the top shows command-line history:

```
1 Generate code (Ctrl+I), or select a language (Ctrl+K M). Start typing to dismiss or don't show this again.
PS D:\FULLSTACK 2026\20260119> Set-ExecutionPolicy RemoteSigned -Scope CurrentUser
PS D:\FULLSTACK 2026\20260119> npm init -y
Wrote to D:\FULLSTACK 2026\20260119\package.json:
```

The right side of the interface includes a Chat window with an AI agent, a status bar at the bottom, and a taskbar at the very bottom.

The screenshot displays two instances of the Visual Studio Code (VS Code) interface side-by-side, both showing the same project structure and files.

Top Window (VS Code):

- File Explorer:** Shows a folder named "20260119" containing "node_modules", ".env", ".se", "package-lock.json", and "package.json".
- Editor:** Two tabs are open:
 - package-lock.json:** Displays a large JSON object representing the dependency tree. It includes fields like "name", "version", "description", "main", "scripts", "keywords", "author", "license", and "type". It also lists "dependencies", "devDependencies", and "peerDependencies".
 - package.json:** Displays a smaller JSON object with basic metadata.
- Bottom Status Bar:** Shows the date and time as "19-01-2026" and "15:23".

Bottom Window (VS Code):

- File Explorer:** Shows a folder named "20260119" containing "node_modules", ".env", ".se", "package-lock.json", and "package.json".
- Editor:** Two tabs are open:
 - package.json:** Displays a smaller JSON object with basic metadata.
 - package-lock.json:** Displays a large JSON object representing the dependency tree.
- Bottom Status Bar:** Shows the date and time as "19-01-2026" and "18:15".

The screenshot shows a code editor interface with a dark theme. In the top navigation bar, the tabs include File, Edit, Selection, View, Go, Run, Terminal, Help, and CHAT. The CHAT tab is highlighted. The left sidebar has an EXPLORER section showing a folder named '20260119' containing node_modules, .env, .se, package-lock.json, and package.json. The package.json file is selected and shown in the main editor area. The code content is as follows:

```
1  {
2    "name": "20260119",
3    "version": "1.0.0",
4    "description": "",
5    "main": "index.js",
6    "Debug": true,
7    "scripts": {
8      "test": "echo \"Error: no test specified\" && exit 1"
9    },
10   "keywords": [],
11   "author": "",
12   "license": "ISC",
13   "type": "commonjs",
14   "dependencies": {
15     "express": "^5.2.1",
16     "react": "^19.2.0"
17   },
18   "devDependencies": {
19     "nodemon": "^3.1.11"
20   }
21 }
```

In the bottom right corner, there is an AI feature panel titled 'Ask about your code'. It includes a text input field, a 'Ask' button, and a dropdown menu set to 'Auto'. A note at the bottom says 'Explore and understand your code'.